BEST: Journal of Humanities, Arts, Medicine and Sciences (BEST: JHAMS)
Vol. 2, Issue 1, Jun 2016, 57-62

INVENTORY OF ARTHROPODA FAUNA IN APPLE PLOT OF DORSET GOLDEN VARIETY IN TIZI-OUZOU REGION OF ALGERIA

GUERMAH DYHIA & MEDJDOUB-BENSAAD FERROUDJA

Laboratoire de Production, Sauvegarde Des Espèces Menacées et Des Récoltes,

Département De Biologie. Faculté Des Sciences Biologiques et Des Sciences Agronomiques,

Université Mouloud Mammeri De Tizi-Ouzou, Algeria

ABSTRACT

This study focuses on the inventory of arthropod in apple plot, Dorset golden variety located in region of Tizi-Ouzou in Algeria. The sampling was conducted by use two trapping methods that are the sweep net and butterfly net, during a study period from March until October 2015 and that lowed us to identify the presence of 41 species of arthropods membership into 30 families belonging to 10 orders.

KEYWORDS: Inventory, Apple Plot, Tizi Ouzou, Dorset Golden, Arthropoda

INTRODUCTION

Apple trees like any plant species form a favorable environment for the spread of pests and infectious diseases (BELHASSAINE, 2014). According to DAJOZ (1980), insects are one of the largest classes in the animal kingdom characterized by its diversity, abundance, but also its occupation very diverse of ecological niches.

In Algeria, the insect fauna study upon fruit trees in general and apple are few in particular. We can cite GUETTALA-FRAH (2009) works in Aurès region. (GUERMAH and MEDJDOUB-BENSSAD, 2016) conducted a population dynamic of the codling moth upon two apple plots in Tizi-Ouzou region in Algeria

The objective of the work is to contribute to the inventory of arthropods enfeoffed to apple cultivation. The study is conducted in treated apple plot of Dorset golden variety in Tizi-Ouzou region (36° 43′ 00″ North & 4° 03′ 00″ EST) in Algeria witch characterized by a Mediterranean climate with mild winter on temperate floor bioclimatic.

MATERIALS AND METHODS

The study was conducted in apple plot, Dorset golden variety, from March until October 2015 covering the fructification period. Sampling of arthropods populations was performed by use of two types of traps namely the sweep net and butterfly net, on a one outing per week.

In the Field

Several methods are applied when sampling namely

Sweep Net

We applied an herbaceous layer of mowing between the rows in the study plot at the rate of once per week during the period from March until late October 2015.

Butterfly Net

This method consists to maintaining the net horizontally with slow movements so that it has imprisoned all butterflies met including other insects. Our job is to apply this method once per week for the studied plot ranging from March until late October 2015.

In Laboratory

The Counting

After counting of individuals, small insects are kept in bottles containing alcohol diluted to 70% with the following information: date, order, family, type of trap and the number of individuals following the study plot. The same information's are stated on petri dishes in which medium to large size individuals are dried, fixed and spread out to prepare for identification

Identification

Determining arthropods species is based on their morphological characteristics and their chaetotaxy by use different identification keys (PERRIER, 1927, 1932; 1961), (PIHAN, 1986), (DELVARE ET ABERLENC, 1989), (CHINERY, 1988), SEGUY (1923)

Operating Results by Composition Ecological Index

Total Species Richness

According RAMADE (2003), total wealth is the total number of species that includes the population considered in a given ecosystem.

Average Species Richness

The average wealth is the average number of species present in a sample of the biotope RAMADE (2003)

Relative Abundance (Centesimal Frequency)

The frequency F is the percentage of individuals of a species Ni relative to total number of individuals N (DAJOZ, 1971).

$$F = Ni \times 100 / N$$

ni: number of individuals species considered.

Operating Results by Ecological Cues Structure

Shannon-Weaver Diversity Index

According BARBAULT (1981), species diversity is measured by different indexes; the most used is Shannon-Weaver index. It is calculated by the following formula

$$H' = -\sum qi \log_2 qi$$

H'**:** diversity index expressed in bits units

qi: probability encountering specie i

ni: Number of individuals of specie i

N: total number of all species

When the diversity index of Shannon-Weaver is high, we will say that the environment is rich in species studied. However, if he takes a low value, it reflects a poverty of the environment studied.

Equitability Index

This index is the ratio of the observed diversity H 'to the maximum diversity H' max (BLONDEL, 1979) H' max is calculated using the following formula

H' max= Log 2 S

S: is the total wealth

H' max: is expressed in bits

E= H'/H max

Aquitability values thus obtained vary between 0 and 1, when it is near 0 it means that the species of the environment are not in equilibrium with each other but there is some dominance of one species over another. If otherwise the value tends to 1 it means that individuals of the species are balanced between them (BARBAULT, 1981)

RESULTS

During this period we captured 41 species distributed in 30 families belonging to 10 orders. Table 1 contains the different species identified during our sampling in study plot.

Table 1: Liste Des Espèces Inventoriées Dans La Parcelle D'étude

Orders	Families	Species	Sweep Net	Butterfly Net
Lepidoptera	Gracilariidae	*Phylonorygaster blancardella*	-	+
	Pieridae	*pierris napi*	-	+
		Pieris brassicae	-	+
		Colias crocea	-	+
Odonata	Libellulidae	*Orthetrum coerulescens*	-	+
Neuroptera	Chrysopidae	*Chrysoperla carnea*	-	+
Hymenoptera	Apidae	*Panurgus* sp.	+	-
		Apis mellifera	+	-
		Eucera longicornis	+	-
	Scoliidae	*Colpa quinquecinta*	-	+
	Andrenidae	*Hyalaeus meridionalis*	+	-
	Pteromalidae	*Pteromalus puparum*	+	-
		Coruna sp.	+	-
	Vespidae	*Lasioglossum calceatum*	-	+
	Megachilidae	*Megachile centuncularis*	+	-
	Formicidae	*Crematogaster* sp.	+	-
		Pheidol pallidula	+	-
		Messor barbarus	+	-
Diptera	Culicidae	*Culex pipiens*	+	-
		Anopheles sp.	+	-
		Aedes sp.	+	-
	Ceratopogonidae	*Culicoides* albicans	+	-
	Syrphidae	*syrphus ribesii*	+	-
		Eristalis tenax	+	-
	Tipulidae	*Tipula lateralis*	+	-

	Empididae	*Empis grisea*	+	-
	Calliphoridae	*Lucilia sericata*	+	-
Heteroptera	Lygaeidae	*Nysius* sp.	+	-
Homoptera	Aphididae	*Aphis fabae*	+	-
		Aphis pomi	+	-
	Psyllidae	*Caccopsylla* sp.	+	-
Coleoptera	Apionidae	*Apion* sp.	+	-
	Bruchidae	*Bruchidius* sp.	+	-
	Curculionidae	*Sitona linearis*	+	-
	Histeridae	*Hister sp.*	+	-
Aranea	Thomisidae	*Synaema globosum*	+	-
	Pisauridae	*Pisaura mirabilis*	+	-
	Salticidae	*Salticidae* sp.	+	-
	Lycosidae	Lycosa narbonensis	+	-
Gasteropoda	Cochlicellidae	*Cochlicella acuta*	+	-
		Cochlicella barbara	+	-

+: The species is present.

-: The species is absent.

Total and Average Wealth

Values of total wealth (S) and medium (Sm) species are listed in Table 2.

Table 2: Total Wealth and Average Wealth of Species

Traps	Sweep Net	Butterfly Net
Total wealth	98	58
Average wealth	3,06	1,83

The most important value was represented by the method of sweep net.

Relative Abundance

The distribution of species caught by different sampling techniques is shown in figure (1) for the sweep net, figure (2) for the butterfly net.

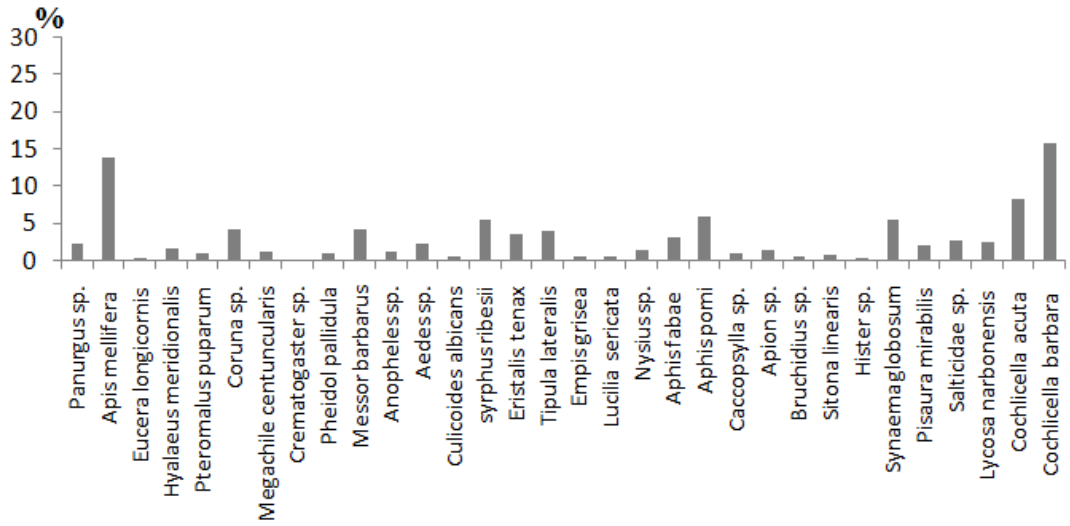

Figure 1: Centesimal Frequencies Species Trapped by the Sweep Net

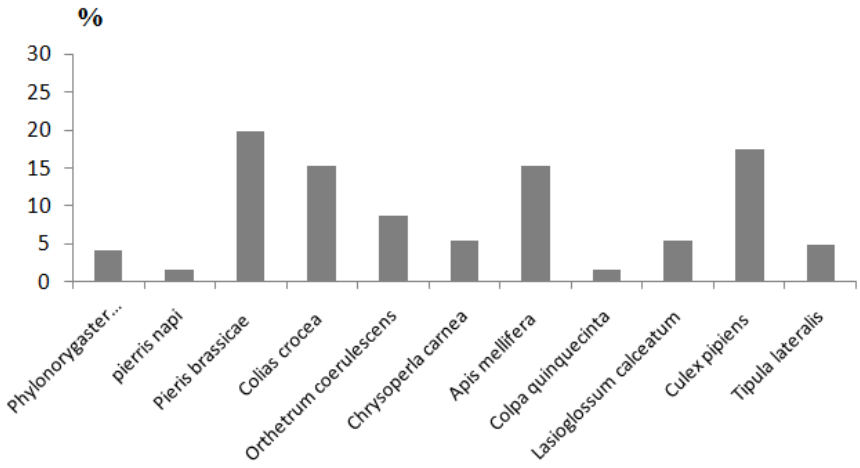

Figure 2: Centesimal Frequencies Species Trapped by the Butterfly Net

The most dominant specie by the application of butterfly net method is *Pier is brasslike* with 19, 91 % then, species *Culex pipiens* with 17, and 42 %.

The most dominant specie by the application of sweep net is *Cochlicella Barbara* with 15, 71% then, specie *Apis mellifera* with 13, and 96%.

Shannon Weaver Index Diversity and Equitability Index (E)

The results that address the indices Shannon-Weaver diversity (H'), the maximum diversity (H'max.) and equitability (E) applied to species trapped by different sampling techniques are presented in Table 3

Table 3: Shannon-Weaver Diversity Values H 'and Equitability of Species Trapped by Various Traps

Traps	Sweep Net	Butterfly Net
H'	4,31 Bits	3,11 Bits
H' max	6,64 Bits	5,88 Bits
E	0,65	0,53

A fairly high equitability is recorded for the two traps (sweep net, butterfly net) this value approaches 1 which reflects a balance between the species of the medium.

DISCUSSIONS AND CONCLUSIONS

During this period we captured 41 species distributed in 30 families belonging to 10 orders. Total wealth of the (S) values obtained by the different sampling techniques is of the order of 98 species for sweep net and 58 species for butterfly net. However, LOUNACI (2003) which studied the biodiversity of Diptera of medical-veterinary interest colonizing the ponds and marshes of Réghaia (Algeria) noted the presence of 72 species of invertebrates.

The most dominant species by the application of butterfly net method is *Pieris brassicae* with 19, 91 %, that represented by the application of the method of sweep net is *Cochlicella Barbara* with 15, 71%

LOUNACI (2003) note que *Culiseta longiarolata* the specie most represented in the cottages GE1 and GE2 of E.N.S.A station with centesimal frequency 62,93 % and 100 % then, *Culex pipiens* with frequency 33,22 % for cottage GE1. However at the swamp of Réghaia the author find that *Culex pipiens* dominate with 54, 7 % by contribution to

another species

The index values of Shannon Weaver are 4, 31 bits for sweep net, 3, 11 bits for butterfly net.

However OUNIS (2014) and *al*., obtained Shannon Weaver values index very low varying from 0,05 to 2,01 Biodiversity orchard soil apricot in Batna.

The equitability obtained for our sample corresponds to the values of 0, 65 for sweep net, and 0, 53 for butterfly net. This result indicates a perfect balance between species occupants in this environment.

GUERMAH (2013) find an equitably 0, 93 OUNIS (2014) and *al*., fin an equitability varying from 0, 12 à 0, 47

REFERENCES

1. BARBAULT.R, 1981. Ecologie des populations et des peuplements.Ed.Masson.et C, Paris, 200p.
2. BELHASSAINE M., 2014. Etude des pore- greffe de quelques rosacées à pépins et à noyaux dans la pepinier de l'etat de la wilya de Telemcen saf-saf . Mémoire Master. Université Abou Bakr Belkaid – Tlemcen. 107 p.
3. BLONDEL.J, 1979**.** Biogéographie et écologie. Ed., Masson, Paris, 173p.
4. CHINERY, (1988). Insectes d'Europe occidentale. Ed. Arthraud. Paris, 307p.
5. SEGUY.E, 1950. La biologie des diptères. Ed Paul Lechevalier, Sér. A, XXVI, Paris, 609p.
6. DAJOZ. R., (1971). Précis d'écologie. Ed. Dunod, Paris, 434 p.
7. DAJOZ R., 1980. Écologie des insectes forestiers. (Écologie fondamentale et appliquée) Ed. Gautier, Paris. 489 p.
8. LOUNACI Z., (2003). Biosystématique et bioécologie des Culicidae (Diptera, Nematocera) en milieux rural et agricole. Thèse Magister, Inst. nati. Agro., El Harrach, 324 p.
9. GUERMAH D., 2013 : Inventaire des diptères dans la région de Tizi Ouzou. (En particulier quelques espèces d'intérêt médico-vétérinaire), mémoire de fin d'étude, Univ. de Mouloud Mammeri. Tizi Ouzou, 50p.
10. GUERMAH D. and MEDJDOUB-BENSSAD F., 2016, Population dynamics of the codling moth *cydia pomonella* (Lepidoptera: Tortricidae) on two apple varieties in Algeria. International Journal of Biological Research and Development, Vol. 6, 1-8.
11. GUETTALA-FRAH, 2009**.** Entomofaune, Impact Economique et Bio- Ecologie des principaux Ravageurs du Pommier dans la région des Aurès. Université Batna .166P.
12. PERRIER R., 1961. La faune de la France. Tome V: les coléoptères. 2ème partie. Ed. LIB. DELAGRAVE, PARIS, 230 P
13. RAMADE.F., 200. ELEMENTS D'ECOLOGIE, ECOLOGIE FONDAMENTALE, 3EME ED. DUNOD. FRANCE .690P.3